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3. Tarapacá has 10,418 inhabitants ; its capital is the town of Tarapacá ; it has 28 villages in the 5 districts of Tarapacá, Iquique, Camiña, Pica, Sibaya.

This province yields the large quantity of nitrate of soda used in agriculture and the arts ; also the new mineral known as the borate of lime and soda.

XIX.—*Observations on the Province of Tarapacá, South Peru.*

By DON M. B. DE LA FUENTE.

Communicated by W. BOLLAERT, Esq., F.R.G.S.

THE province of Tarapacá,* situated at the extreme s. of the Republic of Peru and on the western side of the Andes, is very deficient of water, and may be called rainless. Iquique, the principal port, containing 1700 inhabitants, is wholly supplied with water by distilling that of the ocean. As nature has, however, been prodigal in diffusing over it many valuable productions, such as gold, silver, copper, tin, platina, cobalt, iron, quicksilver, guano, nitrate of soda, borates of soda and lime, alum, salts of various sorts, and other useful substances, it well merits the protection of the government and the continued efforts of science and art.

This section of Peru, probably the richest of its provinces, has excited much attention for the last 150 years, and was first brought into notice by the discovery of the silver mines of Huantajaya (a few miles only from the coast), to which those of Santa Rosa were soon added ; these, with some few other mines, but little worked, have produced in a century 150,000,000 dollars = 30,000,000*l.*

At present the mines are nearly deserted, and have been left in the greatest disorder ; the proprietors absented themselves in consequence of the revolutionary times, which, commencing in 1810, caused a want of workmen, who were drafted off to the wars.

Huantajaya and Santa Rosa are situated in the desert mountains of the coast, being supplied with provisions and water from long distances. In the once famous mines of Huantajaya the following are the only works in operation at the present time and on a small scale only :—

La Mina de Lecaros—the works are at the depth of 200 yards, the ores giving about 8*l.* in the 25 lbs.

The *Quebrada* mine is an interesting work, as it is entering new ground ; great difficulties present themselves by reason of its great depth and bad ventilation.

* See 'Observations on the Geography of Southern Peru,' by W. Bollaert. Journal R. G. S., vol. xxi. 1851.—ED.

San Pedro and San Pablo is an important work according to general opinion.

In the mineral district of Santa Rosa the following mines are worked :—

Mendieta.—A small quantity of ore is extracted, but it is expected to yield in abundance shortly.

Luz.—A cross cut of importance is driving in the direction of a vein in the Carmelitana mine.

Grande.—Rich metals are extracting, but in small quantities only.

There being no other mining operations in the province, it is said, and with some reason, that mining is abandoned, and that new discoveries only would be remunerative; but such can only be brought into work by native or foreign capital.

The existence of the inhabitants of the province of Tarapacá, about 12,000, and suffering under various commercial restrictions, is entirely due to the refining of nitrate of soda and to its exportation free of export duty.

The caliche, or native crude nitrate of soda, is found in layers several feet in thickness in an extended plain, 3500 feet above the sea, and in nearly a continuous line of 70 leagues, running n. and s. nearly parallel to the coast. Its distance from the various shipping ports of Iquique, Patillos, Mejillones, and Guayna Pisagua, is from 40 to 50 miles. Its quality and abundance throughout the line are pretty equal, that of the n. and s. being rather preferred. The principal refining works are near the quarries, and are La Novia, Peña, Sapiga, Pampa Negra, Nequros, and Sur, yielding annually about 600,000 quintals = 30,000 tons.

The same rude refining process, or the separation of common salt from the caliche, has continued without alteration since 1831, when this branch of trade commenced, excepting that English coal is used at places where wood is not to be had. Messrs. Geo. Smith and Co., of Iquique, are occupied in improving the process of refining, as well as in facilitating the transport of the nitrate from the interior to the coast, for shipment to Europe, &c. Since 1830 to 1852-3 about 300,000 tons have been exported.

The value of nitrate annually exported is 1,200,000 dollars = 240,000*l.*; but of this sum little remains in the province, for Chile takes 500,000 for provisions and timber; Lluta (a neighbouring district), in payment of beasts of burden, 100,000; Arica, for provisions, 40,000; Bolivia, for oxen, sheep, mules, asses, &c., 150,000; Tacua, Arequipa, and Lima, for goods from thence, 120,000; mercantile establishments, 150,000; thus the saliteros, or nitrate of soda quarriers and refiners, farmers, muleteers, and the other working population of the province, get about 110,000 dollars as their share.

The crude nitrate of soda is found combined with varying proportions of common salt, some sulphates of soda and lime (Glauberite), muriate of lime, and iodic salts. On arrival in this country it contains a small per cent. of impurities, as insoluble matters and moisture, 2·60+ ; sulphates, 0·40+ ; muriates, 2·00 = 5 per cent.

The borate of lime, which has lately been discovered, and offers a new branch of industry to the province, is met with generally under the beds of nitrate of soda, and near to where there is humidity. As yet this valuable substance has only been found sparingly ; not more than 150 tons have been exported, but hopes are entertained that this mineral will be discovered in large quantities. The experiments on this new mineral have been most satisfactory, particularly as to its percentage of boracic acid. The following is the most recent analysis by Mr. Dick, under the superintendence of Dr. Percy :—Water, 27·22 ; sulphuric acid, 1·10 ; lime, 14·32 ; soda, 8·22 ; potash, 0·51 ; chloride of sodium, 1·65 ; sand, 0·32 ; boracic acid and nitric acid, by loss, 46·66, the nitric acid being about 1·00, with trace of phosphoric acid and iodine. This mineral is sometimes called Hayesine, tiza, and hydro-boro-calcite. Sixty pounds per ton and upwards have been paid for this article in London and Liverpool, by parties connected with glass-making, pottery, and smelting.

Guano is found in abundance on the coasts of the province from near Patollas to the River Loa, a distance of 30 leagues, there being but few intervals without it. Its exportation is prohibited by the government, and is only taken from the Pabellon de Pica, as a fertilizer, for the use of the province.

The agricultural operations of Tarapacá are on a very reduced scale indeed, in consequence of the great scarcity of water. The production of alfalfa, or herbage for animals, is only sufficient for 5000 to 6000, to which must be added dry pasture from Arica, and 50,000 fanegas of barley from Chile. Various hydraulic works might be effected : the most important projects are for bringing down more water from the mountains to the town of Tarapacá. Artesian wells might be sunk at Pica.

In the valley of Maní, adits might be driven into the surrounding hills, from which would flow sufficient water for all the land anciently under cultivation.

At Quilliagua, on the River Loa, canals or aqueducts are in course of formation for the purposes of irrigation. The difficulties of this enterprise are already conquered, and what remains to be done is easy of accomplishment.

Agricultural operations have commenced in the Pampa de Tamarugal, assisted only by the humidity arising from subterranean water : these are called "Chacras sin riego," or farms without irrigation.

It remains to propose the principal measures that should be adopted for the advancement of this interesting province. The port of Iquique, with an increasing population, ought to become the capital of the district instead of the town of Tarapacá, which has not 1000 inhabitants, and is very far in the interior. Iquique is the most important port and point of the province, particularly for the exportation of the nitrate of soda; and it should be made an open port by the government, instead of being, as it now is, under great restrictions. The importation of provisions, machinery, and tools for the various departments of industry, should be entirely free, until its own agricultural produce was found sufficient for its maintenance.

XX.—*Notes on the Bonin Islands.* By Captain MICHAEL
QUIN, R.N., F.R.G.S.

Read, April 28, 1856.

Extract of Letters relative to Port Lloyd, Peel Island; one of the Bonin Group, in lat. 27° 6' N., long. 142° 16' E.

June, 1837. H.M.S. 'Raleigh.'

[AFTER Captain Beechey's visit to and naming this island and port, and taking formal possession of the group, as per inscription in good preservation on a sheet of copper, as follows:—"H.B.M. ship 'Blossom,' Captain F. W. Beechey, took possession of this group of islands, in the name and on the behalf of His Britannic Majesty, George IV., 14th June, 1827."]*

1830. The first settlers were Richard Millichamp, a native of Devonshire, and his partner Mateo Mozaro, of Ragusa, who had been many years in the employment of Mr. Bennett of Rotherhithe, near London, an owner of whale-ships in the South-Sea fishery, and had also served on board an English sloop of war, named 'La Morne Fortunée,' in the West Indies. They sailed from "Oahu," the 21st May, 1830, with two Americans, one Dane, and a party of Sandwich Islanders, viz. five men, ten women, in all twenty persons, with the countenance and support of Mr. Richard Charlton, his Majesty's consul for the Sandwich Islands, who supplied Messrs. Millichamp and Mozaro with an "union-jack," and a paper describing them as deserving persons, who had, at their sole expense and risk, fitted out an expedition to settle on one of the "Bonin Islands," as per accompanying documents. From the schooner that brought them from "Oahu" two Sand-

* 1824. Capt. Coffin visited the *southernmost* group.—1825. Peel Island, in the *central* group, was visited by the English ship 'Supply.'—1826. The English whaler 'William,' Capt. Th. Young, was wrecked on Peel Island.—1826. English whaler 'Timor.'—1827. Capt. Beechey.—1828. Capt. Lütke.—1853. Commodore Perry.—ED.